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I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE UNITED STATES POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: MAIL STOP REPLY BRIEF – PATENTS, COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VIRGINIA 22313-1450 ON THE DATE INDICATED BELOW.

BY: Peggie Desmuke DATE: July 3, 2003

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Appellant: PAUL A. UNDERBRINK, RICKE W. CLARK, CHRISTIAN LEVESQUE, GUANGMING YIN, PATRICK D. RYAN	§	Confirmation No.:	3874
Filed:	September 13, 1999	Art Unit:	2685
Serial No.:	09/394,189	Examiner:	Charles Craver
For:	DIRECTIONAL ANTENNA FOR HAND-HELD WIRELESS COMMUNICATIONS DEVICE	Docket No.:	600456-0023 (B64418C)

Mail Stop Reply Brief – Patents
Commissioner for Patents
P.O. Box 1450
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ATTENTION: Board of Patent Appeals and Interferences

APPELLANT'S REPLY BRIEF (37 C.F.R. § 1.193)

This Reply Brief is being submitted in response to the Examiner's Answer mailed May 6, 2003 and is being timely filed within the two month period of time set for response.

If any additional fees associated with this Reply Brief are due, please charge such fees and credit any overcharge to Deposit Account No. 01-0657. Two additional copies of this Reply Brief are enclosed.

Section (11) of the Examiner's Answer (page 14 through page 16) includes new points of argument. Appellant's arguments below address only such new points of argument.

1. Examiner's Construction of Claims 1, 8, 22, and 27

Claim 1 includes "the impedance of the antenna determined by performing a finite element analysis on a design of the antenna to determine an estimated output impedance, and adjusting the antenna if the estimated output impedance does not approximately match the transmitter amplifier output impedance." In the Examiner's Answer, the Examiner presents a new construction of this claim element: "Erturk further states that 'the passive components, whose time and frequency domain characteristics include mutual coupling, are obtained with a FTDT algorithm, are modeled as a 4-port network and represented by the corresponding scattering matrix.' This is read by the examiner as follows: first, the passive components include the antenna, as well as the microstrip line of the transmitter portion. Second said components have time and frequency domain characteristics, such as frequency response and inherent impedance (an S-domain, or frequency domain characteristic). Said characteristics include mutual coupling, i.e. impedance. Third, said characteristics are modeled with said FTDT protocol, which is read as a finite element analysis. Thus, a finite element analysis is utilized to determine the expected impedance of the notched antenna based on the design and notch data. The impedance must be matched, which would include the inherent step of determining the output impedance of the transmitter portion, else there would be nothing to match the antenna impedance to. Given that the antenna notch design is "optimized" to match the transmitter portion in design, such includes, of course, the adjustment of the design to match the impedance properly."

As extensively discussed on pages 4-5 of Appellant's Brief, *Erturk* discloses that "the output port of the active device is directly connected to a microstrip patch antenna via a microstrip line. By introducing a notch, whose width is optimized with a modified transmission line model, the input impedance of the antenna at resonance is matched to the characteristic impedance of the microstrip line." Thus, it is the microstrip line that is notched, not the antenna, and it is the microstrip line impedance that is adjusted, not the antenna impedance. The Examiner's construction of the claim element as requiring the three additional steps is a question of law that is reviewed *de novo*.

The Examiner's new construction includes three elements:

- First, the passive components include the antenna, as well as the microstrip line of the transmitter portion.
- Second said components have time and frequency domain characteristics, such as frequency response and inherent impedance (an S-domain, or frequency domain characteristic).
- Third, said characteristics are modeled with said FTDT protocol, which is read as a finite element analysis.

Are any of these three elements required by a proper construction of "the impedance of the antenna determined by performing a finite element analysis on a design of the antenna to determine an estimated output impedance, and adjusting the antenna if the estimated output impedance does not approximately match the transmitter amplifier output impedance?" No – because the impedance adjustment is performed prior to these steps, using a modified transmission line model. Why is this analysis performed? The answer is provided by the next sentence in *Erturk* that follows the sentence quoted by the Examiner – "The non-diagonal elements of the S-matrix which correspond to the values of mutual coupling can be neglected, since they were found to be small." The analysis described in *Erturk* and used by the Examiner to construe claim 1 was in fact only performed to determine whether the mutual coupling could be neglected, and not to determine the estimated output impedance of the antenna.

Furthermore, the Examiner's construction of the claim requires the notch in the transmission line to be a portion of the antenna, but then this construction is directly contradicted by the Examiner - "the examiner reads the ***line as a part of the transmitter portion*** of the invention of *Erturk*, the matching of the antenna impedance to the line is matching the antenna to the transmitter portion." Examiner's answer, last paragraph of page 15 to page 16 (emphasis added). If the line is a part of the transmitter portion, then adjusting the impedance of the line is adjusting the impedance of the transmitter portion to the antenna, and not adjusting the impedance of the antenna to the transmitter portion! *Erturk* vaguely states that by "introducing a notch, whose width is optimized using a modified transmission line model, the input impedance of the antenna at resonance is matched to the characteristic impedance of the microstrip line." Is the notch in the transmission line or the patch antenna? It is not clear from Figure 1 of *Erturk*, as asserted by the Examiner. Further, why is a modified transmission line model used to optimize

the width of the notch if the notch is in the antenna and not in the transmission line? Finally, and most importantly, even if the vague and brief disclosure of *Erturk*, which fails to clearly identify whether Figure 1 shows the notch and whether the notch is in the antenna or the transmission line, is construed to mean that the notch is in the antenna, it is indisputable that the notch "width is optimized using a modified transmission line model," and not a finite element analysis, so that "the input impedance of the antenna at resonance is matched to the characteristic impedance of the microstrip line." The Examiner's claim construction, which adds elements for determining whether mutual coupling can be neglected, is improper, and *Erturk's* brief and summary disclosure not only fails to disclose "the impedance of the antenna determined by performing a finite element analysis on a design of the antenna to determine an estimated output impedance, and adjusting the antenna if the estimated output impedance does not approximately match the transmitter amplifier output impedance," but further explicitly discloses that the only impedance adjustment is performed using a modified transmission line model, and not based on a finite element analysis.

Claim 8 includes "the impedance of the transmit antenna determined by performing a finite element analysis on a design of the transmit antenna to determine an estimated output impedance, and adjusting the area of the transmit antenna if the estimated output impedance does not approximately match the transmitter amplifier output impedance." Claim 22 includes "the antenna has an impedance that matches an output impedance of a transmitter amplifier of the handheld device, the impedance determined by performing a finite element analysis on a design of the antenna to determine an estimated output impedance, and adjusting the antenna if the estimated output impedance does not approximately match the transmitter amplifier output impedance." Claim 27 includes "determining the output impedance of a transmitter amplifier of a wireless device; performing a finite element analysis on a design of a patch antenna to determine an estimated output impedance; adjusting the area of the patch antenna if the estimated output impedance does not approximately match the transmitter amplifier output impedance; and providing the patch antenna for use with the wireless device." The reasons discussed above in regards to the Examiner's improper construction of claim 1 as well as the disclosure of *Erturk* that contradicts the Examiner's interpretation of that reference apply equally to claims 8, 22, and 27.

Respectfully submitted,

7/3/03
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